Diaphragm Wall and C.F.A. Piling

Riverside South, Canary Wharf

LONDON, U.K.

Diaphragm Walls, CFA Piles and Civil Engineering

INTRODUCTION

Bachy Soletanche carried out the diaphragm wall and piling works for the Riverside South Development, on the Canary Wharf Estate. This was to construct the 15m deep basement wall and 990no. CFA bearing piles for the 43 story twin towers. These works were carried out as part of a joint venture with Costain Ltd. who were responsible for the sheet-piling and excavation works.

The Diaphragm Wall was proposed by Bachy Soletanche as an alternative to secant piling. This offered the client a better level water-tightness and improved verticality for the basement, part of which is located along the River Thames and subject to high tidal water pressures.

The Proposed Riverside South Development

CLIENT:	**Canary Wharf Group**
MAIN CONTRACTOR:	**Costain Bachy Soletanche JV**
CONSULTING ENGINEER:	**Arup**
DURATION OF WORKS:	**21 months**

Scope of Works

Bachy Soletanche : Pile probing : Obstruction removal, 1500mm dia. with thick wall casing; Guide wall installation; Diaphragm walls, 210 lin.m of 1.0m thick & 410 lin.m of 1.2m thick; Breaking down of Diaphragm walls and Capping Beam construction; Dewatering; Waling Beam and Propping; 900mm dia. 12m deep contiguous wall, 900no. 900 mm dia. CFA piles up to 27m long.
Costain: Welfare; Sheet pile removal; Sheet pile installation; Bulk excaction and muck away

The site was a former dockyard in this part of East London and contained five different docks at a number of differing levels and dock layouts.

Obstruction Removal

As such a number of sub-surface existing structures such as U-shaped locking docks consisting of a 1m thick concrete wall and 2m thick base slab, masonry wall and timber piles. The 600m long perimeter of the wall layout was probed prior to commencement of the works in order to locate the old dock obstruction.

The old docks were cored out using 1500mm diameter coring equipment and rock augers down to a depth of 12m. The cored material was replaced with a soft slurry mix which the diaphragm wall grabs could easily dig through.

KS Hydraulic Grab Diaphragm Walling Rig Digging

Three crane mounted KL rope grabs were mobilised for the diaphragm wall excavation, and during the project these were reinforced with a more powerful crane mounted hydraulic KS grab, brought in to enable quicker excavation through the hard Thanet sands, encountered at depth. The main challenge of the diaphragm wall construction was to maintain a continuous excavation production within the restricted site area where other activities such as sheet-pilling, obstruction coring, guide walls and capping beam construction, were ongoing at the same time.

Installation of diaphragm wall cage

The diaphragm wall panels varied from 13 to 30m in depth, with thickness ranging from 1000mm to 1200mm. BSL also coordinated the construction of a complex capping beam via one of its subcontractors. The capping beam was constructed in sections following the progress of the diaphragm wall. The diaphragm wall construction took 8 months to complete and upon completion of the capping beam the bulk excavation works undertaken by BSL joint venture partners Costain Ltd. could commence

900mm dia. CFA Piling to 27m

The CFA work involved the construction of approximately nine hundred and ninety 900mm diameter CFA piles with depths ranging from 15m to 27m. An innovative, in house designed solution was employed as some of the pile cages needed to be plunged to depth up to 10m below platform level. A plunging frame mounted on a vibrator was developed to plunge the piles cages down to their design cut-off level, saving a considerable amount of time and money.

Exposed Diaphragm Wall during excavation and CFA piling

The project was a good example of Bachy Soletanche and Costain's ability to coordinate the various ongoing activities of a major project via efficient planning, good teamwork and site management. High standards of safety and quality were also maintained throughout the project for the delivery of a high quality building foundation.